INSTRUCTION MANUAL

Raven100 CDMA AirLink Cellular Modem

Revision: 7/07

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RMA#_____
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Raven100 CDMA AirLink Cellular Modem

1. General Description

This manual provides information for interfacing the AirLink Raven100 cellular modem to Campbell Scientific dataloggers. An AirLink CD ships with the modem that includes AirLink manuals and software utilities. AirLink manuals referenced in this manual include:

AirLinkSetupWizard_InstallationInstructions.pdf
WirelessAce3G_UserGuide2.00.pdf
Verizon_CDMA_Raven_UserGuide2.20b.pdf
Verizon_CDMA_Raven_QSG2.15.pdf

The Raven100 digital cellular modem is manufactured by AirLink for use on the Verizon Wireless Code Division Multiple Access (CDMA)/1xRTT network. The modem is accessed through the Internet using TCP/IP communications protocol using a Static or Dynamic IP address.

- A Static IP address is permanently assigned to a particular account and will always be used whenever the Raven connects to the Internet.
- A Dynamic IP address is assigned on a "need to have" basis. A dynamic IP address is used with a service such as IP Manager (Section 5.4) to translate a dynamic IP address to a domain name, so that the Raven can be contacted by name as if it had a static IP.

A Verizon account can be setup for a Static or Dynamic IP address; a Static IP is preferred. Generally, there is a one-time per customer charge to activate a Static IP account. Once activated, additional Static IP accounts may be added at no additional charge.

2. Establish Cellular Service

2.1 Raven100 Cellular Coverage/Service Requirements

What you need:

Verizon Wireless CDMA/1xRTT coverage at the datalogger site. For a coverage map, refer to: www.verizonwireless.com/b2c/mobileoptions/nationalaccess/serviceAvailability.jsp).

CDMA/1xRTT Static IP or Dynamic IP account established at Verizon Wireless. Verizon's National Access Plan (Internet APN) is recommended.

To setup an account you will need the ESN number of the modem. The ESN number is listed on a label on the modem, and also on the box. To setup an account with Verizon Wireless, call:

888-384-1775 for Business Sales
888-256-4646 for Personal Sales

What you receive from Verizon:

10-digit Mobile Directory Number (MDN)
Mobile Identification Number (MIN)
System Identification Number (SID)
IP address (for a Static IP account only)

The MDN and MIN are typically the same number, but make sure you get both numbers.

3. Specifications

3.1 Raven100 Specifications

AirLink Raven100 models C3210, C3211

RF Output: 224 mW (+23.5 dBm)

CDMA Modes Supported: CDMA2000 1X, IS-95B Circuit Switched CDMA, and SMS

Dual-band Support: 800 MHz cellular, 1.9 GHz PCS bands

Packet Mode (1xRTT) Data Rates: up to 153.6 kbps (forward channel), 76.8 kbps (reverse channel)

RS-232 Data Rates: 1200 bps to 115.2 kbps

Input Voltage: 10 to 28 Vdc

Input Current: 50 to 250 mA

Typical Current Drain at 12 Vdc: 40 mA dormant connection (idle for 10 to 20 seconds), 200 mA while receiving, ~200 mA during transmission

Operating Temperature Range: -30° to +70°C (10% duty cycle limit above 60°C)

Operating Humidity: 5% to 95% non-condensing

Serial Protocols: AT Commands, PPP, SLIP, UDP, TCP

Serial Interface: RS-232, DB-9F

RF Antenna Connector: 50 Ohm TNC

Status LEDs: Power, Channel Acquired, Link Status, Network Registration, RSSI, Transmit/Receive, Block Errors

Dimensions: 3"W x 1"D x 5.1"L (5.8"L w/connector), 7.6 W x 2.5 D x 13 L cm (14.7 L cm w/connector)

Weight: < 1 lb (<0.5 kg)

4. Configuration

4.1 Base Station Requirements for Raven100

PC running Campbell Scientifics' LoggerNet or PC400 software, with access to the internet.

4.2 Datalogger Site Equipment

- Raven modem with power cable (included with modem).
- Datalogger—21X, CR510, CR10(X), CR23X, CR7, CR1000, CR5000, CR3000, CR800.
- SC105 or SC932A Interface—connects the modem to the 21X, CR510, CR10(X), CR7, or other dataloggers' CS I/O port.

NOTE If you have a black SC12 cable that is not Rev 1 or newer (as indicated on cable), it is a CS I/O cable only and will not work for RS-232. Connect the black SC12 cable between the datalogger and the SC932A. Use a 9-pin serial cable or a blue ribbon cable between the phone and the SC932A.

- PN 18663 Null Modem Cable—connects the modem to the CR23X, CR3000, CR800, CR2XX, CR1000 or CR5000 RS-232 port.

SC105 interface connects the modem to a datalogger's CS I/O port; recommended for dataloggers with the Pakbus Operating System.

SC932A interface connects the modem to the CS I/O port; recommended for dataloggers with the Mixed-Array Operating System.

PN 18663 null modem cable connects the modem to a datalogger's RS-232 port (not compatible with the 21X, CR510, CR10X, or CR7 dataloggers).

FIGURE 4.2-1. Modem Interface Options.

- PN 13493 Raven Mounting Kit—includes mounting hardware for securing the modem to below referenced environmental enclosure and a 9-pin male to 9-pin female cable.

  - Antenna—the following antennas are available from Campbell Scientific. Contact a Campbell Scientific Applications Technician for help in determining the best antenna for your application.

    - The **18285** 1 dBd omnidirectional antenna. This antenna is dual band, covering both the 800 MHz and 1.9 GHz bands, and is strongly recommended where cellular coverage is strong. The 18285 includes 10 feet of cable fitted with a TNC male connector for attachment to the Raven, and a mount/u-bolt assembly for attaching the antenna to a mast, post, or crossarm up to 1.5" (3.8 cm) in diameter.

    - The **14454** 9dBd Yagi Antenna is a higher gain antenna that should be "aimed" at the service provider's antenna. The 14454 includes 10 feet of cable fitted with a TNC male connector for attachment to the CDMA modem, and a bracket/u-bolt assembly for attaching the antenna to a mast or post. This antenna is recommended for fringe areas that require a higher gain antenna.

    - The **14453** Half-Wave Dipole Whip Antenna is a lower gain antenna used in transmitting short distances. It is an 800 MHz cellular antenna that terminates in a TNC Female connector for attachment to the Redwing modem. This antenna is intended for use inside the enclosure. Please note that the backplate of the enclosure is a grounded plane. If it is interposed between the antenna and the cell tower, it may attenuate the strength of the transmission signal. Simply turning the enclosure 90 to 180 degrees on its mounting mast may solve weak transmission issues.

PN 18285 1 dBd Omni Directional Antenna

PN 14454 9dBd Directional Yaggi Antenna

PN 14453 Half-Wave Dipole Whip Antenna

FIGURE 4.2-2. Antennas for Use with the Raven Modems

- Power Supply (see power considerations).
- Environmental Enclosure— ENC 10/12, ENC 12/14, or ENC 16/18.

4.3 Power Considerations

- A power cable included with the modem connects to the datalogger's 12 V or switched 12 V terminal. Connection to the switched 12 V terminal allows the datalogger to switch power to the modem during scheduled transmission intervals if desired.

- When using the switched 12 V terminal, the modem can typically be powered with a BP12 battery, CH100 charger/regulator, and MSX10 solar panel.

5. Program the Raven100 Modem

The following software is used to program the modem:

Airlink's SetupWizard, which provisions and activates the modem.

Airlink's Wireless Ace 3G, which is used to configure settings in the modem and load Campbell Scientific's Raven CDMA template file. The Setup Wizard and Wireless Ace 3G utilities are available from Airlink's website (www.airlink.com/support). The CD that ships with the modem includes the Wireless Ace 3G utility (but not the Setup Wizard) and the Airlink manuals.

Campbell Scientific's "Raven CDMA Template 115200" file is for dataloggers that support 115200 baud (e.g. CR1000), the "Raven CDMA Template 9600" file is for dataloggers that support a maximum baud rate of 9600 (e.g. CR10X). The template file configures the modem to be compatible with CSI dataloggers. Template files are available from Campbell Scientific's Website: www.campbellsci.com/downloads.

5.1 Setup Wizard Installation

The Setup Wizard is used to provision and test the modem, and perform firmware updates where necessary.

The Setup Wizard utility is available from AirLink (http://www.airlink.com/support). Once the application has been installed, it can be run from the Windows Start menu or from the desktop icon.

5.2 Using the Setup Wizard to Provision and Activate the Modem

1. Connect the modem to the computer's serial port using a serial cable.

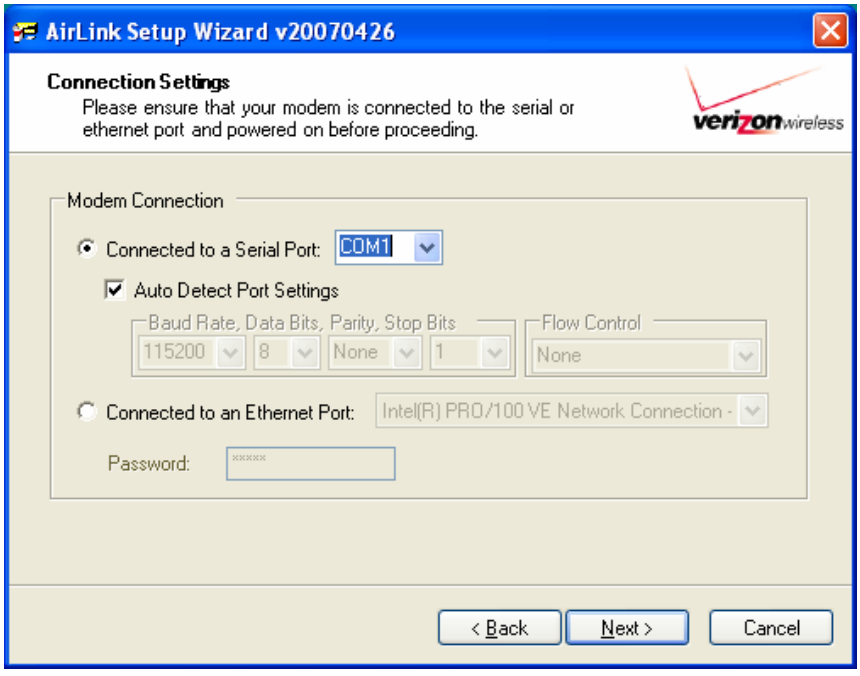
2. Connect the power cable to 12 V, and the antenna to the modem.

3. Run the Setup Wizard from the Windows Start menu (Start>All Programs>AirLink Communications>Setup Wizard>Setup Wizard).

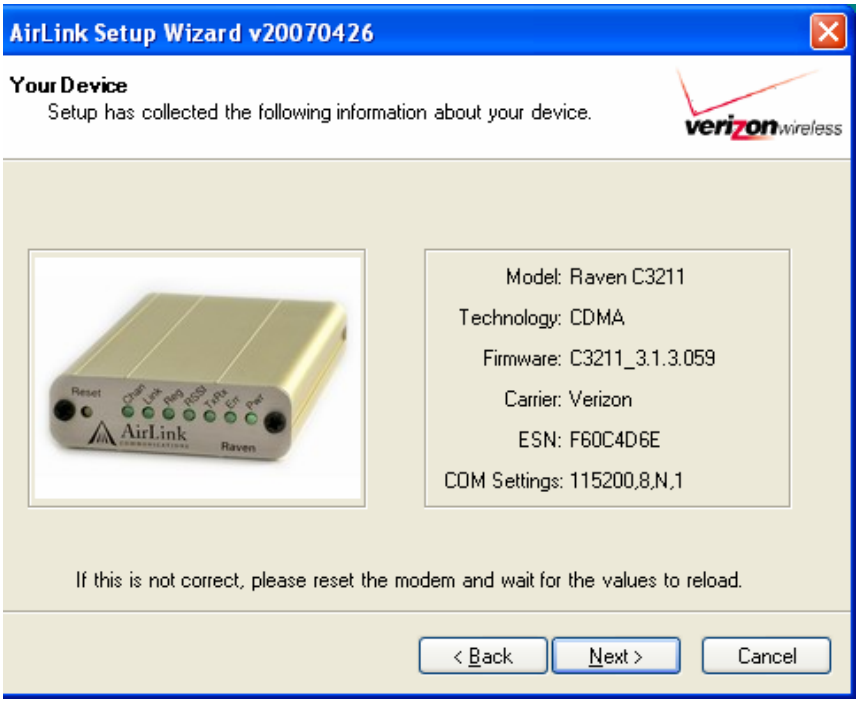
Follow the prompts from the Setup Wizard and enter the information as described below:

AirLink Setup Wizard v20070426
AirLink
COMMUNICATIONS
Welcome to AirLink Communications
This wizard can help you with the following tasks. Press "Next" to continue.
1. Update modem firmware
2. Activate the modem
3. Test the wireless connection
4. Setup a DUN connection (if applicable)
verizon wireless
Next >
Cancel

Click Next.

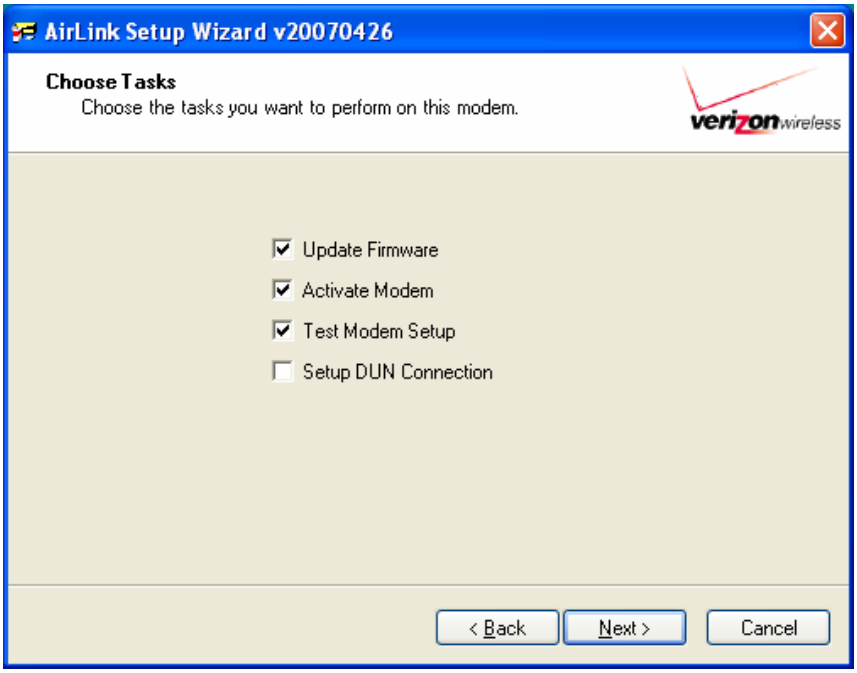


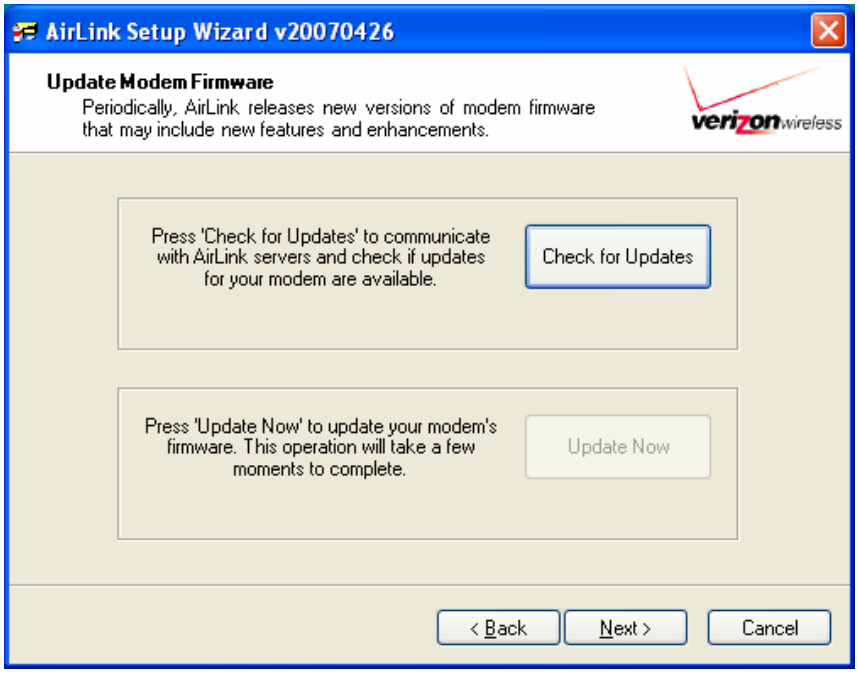
Select “Connected to Serial Port”, select the COM port from the pull down menu, and check “Auto Detect Port Settings”.


AirLink Setup Wizard v20070426
Your Device
Setup has collected the following information about your device.
verizon wireless
Model: Raven C3211
Technology: CDMA
Firmware: C3211_3.1.3.059
Carrier: Verizon
ESN: F60C4D6E
COM Settings: 115200,8,N,1
If this is not correct, please reset the modem and wait for the values to reload.
< Back
Next >
Cancel

This window should show the details for your modem. If the incorrect modem is displayed, press the Reset Button on your modem.

Click Next to get the following screen. Check all boxes except the "Setup DUN Connection", and click Next.



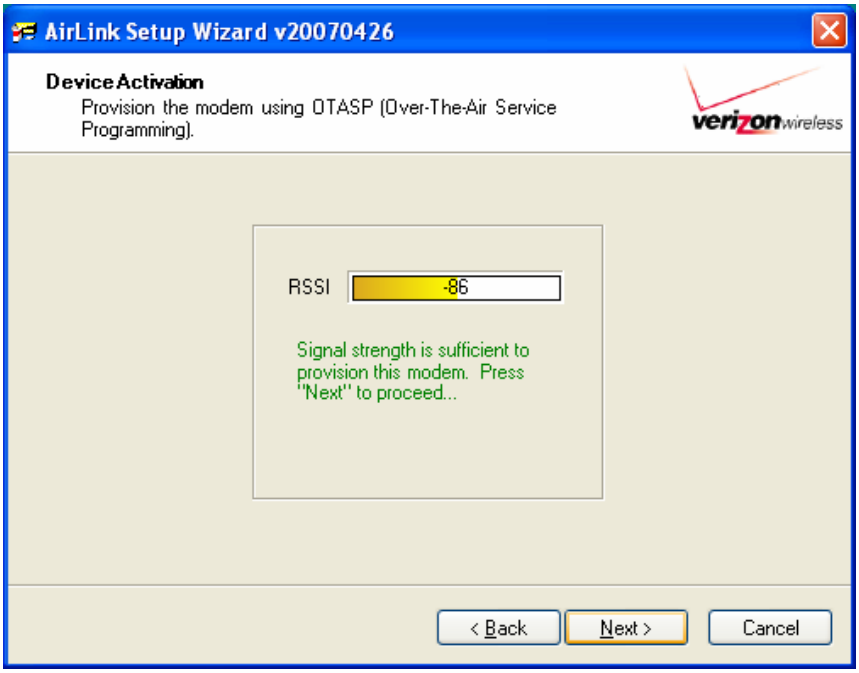

AirLink Setup Wizard v20070426
Update Modem Firmware
Periodically, AirLink releases new versions of modem firmware that may include new features and enhancements.
verizon wireless
Press 'Check for Updates' to communicate with AirLink servers and check if updates for your modem are available.
Check for Updates
Press 'Update Now' to update your modem's firmware. This operation will take a few moments to complete.
Update Now
< Back
Next >
Cancel

Click on “Check for Updates”. While checking for updates, the Setup Wizard needs to use the Internet connection on your computer to connect to the AirLink server. Your modem is not connected to the wireless network for this process. AirLink frequently releases updates to the firmware for your modem. These updates can include new features as well as bug fixes. To make sure your modem is at optimal performance, it is recommended to Check for Updates and Update Now.

Click Next to activate modem.

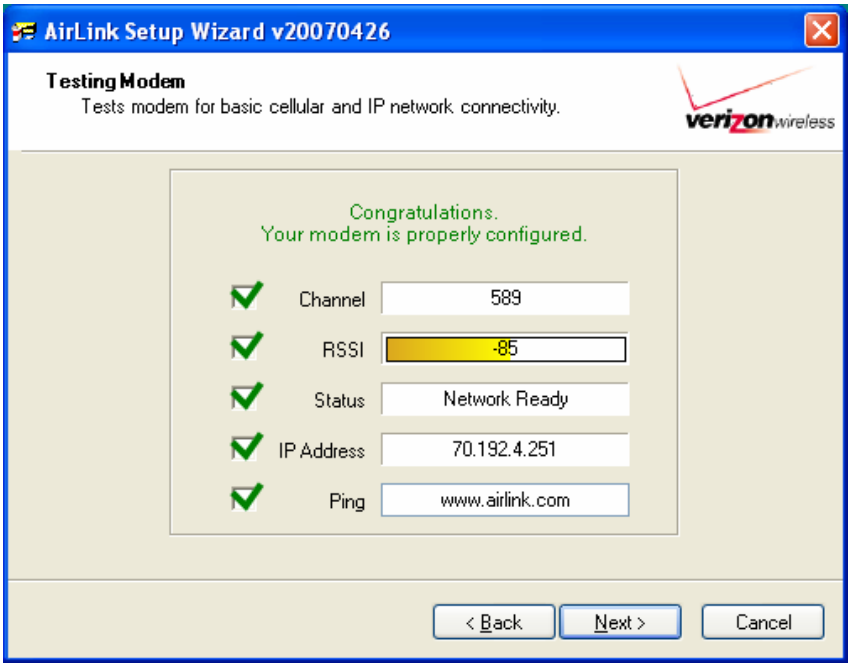
Older modems will prompt for the Carrier Mobile Directory Number (MDN) and Carrier Mobile Identification Number or Mobile Subscriber ID (MIN/MSID). The MDN and MIN/MSID numbers may be different.

Newer modems get these numbers, and the rest of the data required for activation automatically from the cellular network using Internet Over The Air (IOTA).



If the RSSI is insufficient to provision the modem, change the antenna or relocate the modem and try again. Once you have entered these settings, the modem will begin "provisioning" and setting the configuration into memory, which may take a few minutes.

Using the Verizon cellular network, the modem's connection to the Internet is tested. Green checks in the boxes indicate the tests were successful and the modem is functioning properly.



The tests, depending on the strength of your signal, may take a few minutes. Initially, while the tests are being performed, there may be red Xs in the boxes. At this point your modem is configured and activated to work on the Verizon network.

The figure below shows how the modem lights should appear when it is registered on the network. The RSSI light shows the strength of the signal and may be solid (strong) or flashing (weaker). The Tx (transmit) and Rx (receive) lights will flash as data is transferred to and from the modem on the network. If the Reg light on the modem is not lit, double-check your device activation information and return to the Activate Modem steps to reconfigure your modem.

5.3 Using Wireless Ace 3G to Configure the Modem

After the Raven has been provisioned with the Setup Wizard (Section 5.2), certain settings have to be changed for the modem to be compatible with CSI dataloggers. The recommended way to change the settings is to send a template file to the modem using the AirLink Wireless Ace 3G utility.

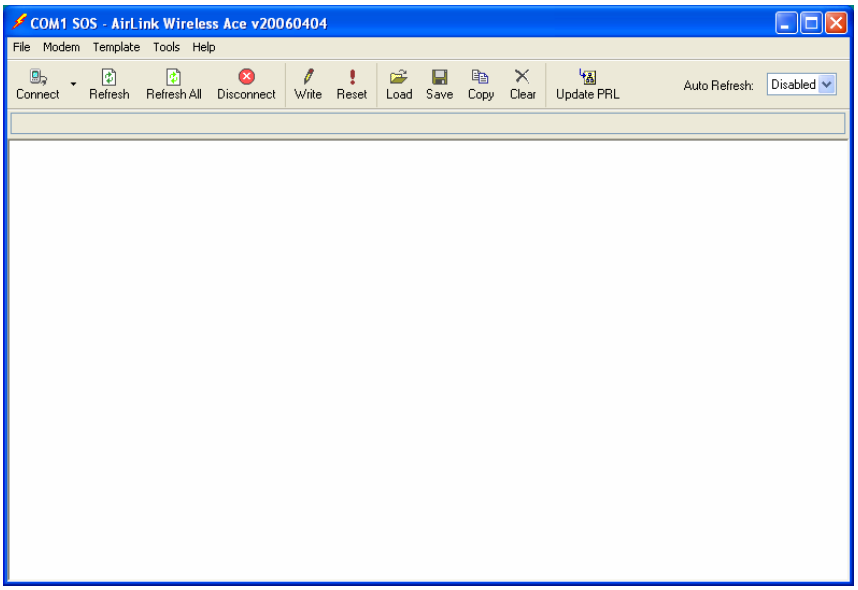
The Wireless ACE 3G utility is on the CD that ships with the Raven modem, and is also available from AirLink (http://www.airlink.com/support).

To install Wireless ACE 3G from the AirLink CD, click on the "Wireless ACE 3G" link under Modem Utilities and follow the prompts. Once the application has been installed, it can be run from the Windows Start menu, or from the icon on the desktop.

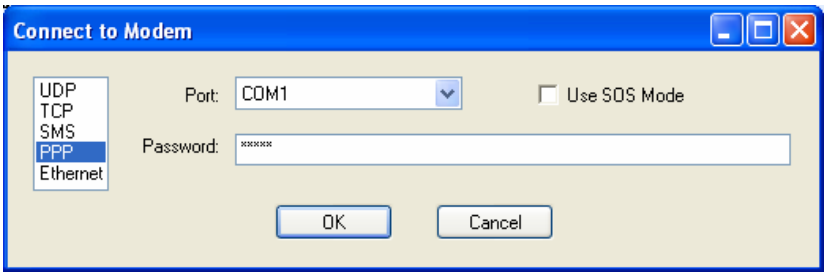
Campbell Scientific's "Raven CDMA Template 115200" file is for dataloggers that support 115200 baud (e.g. CR1000), the "Raven CDMA Template 9600" file is for dataloggers that support a maximum baud rate of 9600 (e.g. CR10X). The template file configures the modem to be compatible with CSI dataloggers. Template files are available from Campbell Scientific's Website: www.campbellsci.com/downloads.

Connect the Raven to a com port on the PC with a direct RS-232 cable. Also connect the antenna, and 12V power.

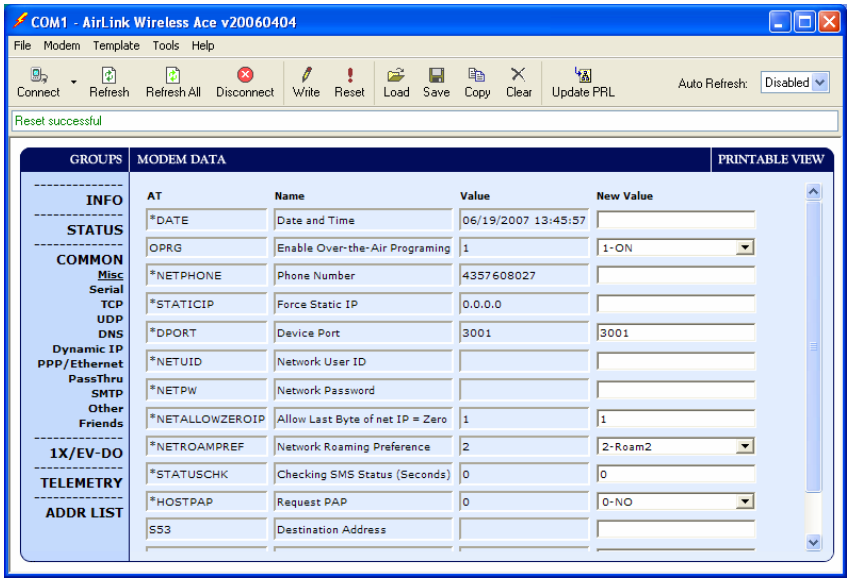
Run Wireless Ace 3G to get the following screen:

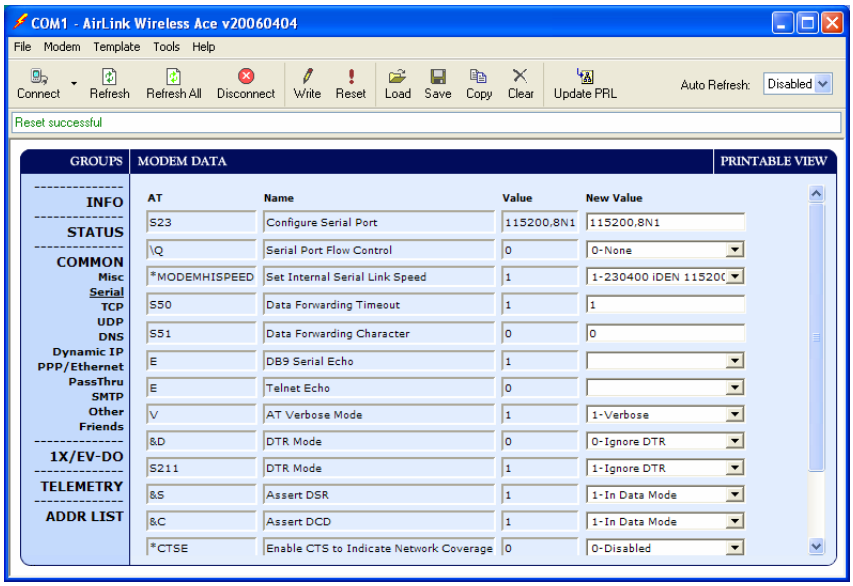

COM1 SOS - AirLink Wireless Ace v20060404
File Modem Template Tools Help
Connect Refresh Refresh All Disconnect Write Reset Load Save Copy Clear Update PRL
Auto Refresh: Disabled

Click the **Connect** icon in the Configuration Panel to open the connection options dialogue box. Select PPP, and the COM port the modem is connected to. Do not change the Password (the default password is 12345). Click OK to continue.



Click the **Load** icon in the Configuration Panel. When prompted for a template file name, select ravencdma_115200.xml or ravencdma_9600.xml file (downloaded from the CSI website). The following screens show the settings for the Miscellaneous and Serial settings after the template file has been loaded.





Click the **Write** icon to save the changes made by the template file**.**

Click the **Reset** icon to restart the modem. The other ways to reset the modem are by pressing the reset button on the front of the modem or removing the power from the modem.

WARNING

Unless you Write the commands, the changes made in New Value will not be sent to the modem. For some commands unless you Reset the modem, the newly written values will not take effect.

Click the **Disconnect** icon to terminate communications with the modem.

5.4 Configuring the Raven for Dynamic IP

Dynamic IP addresses are granted only when a modem or other device is connected and can change each time the modem or device reconnects to the network.

IP Manager is a free service provided by AirLink for the Raven to translate a dynamic IP address into a fully qualified domain name so it can be contacted directly on the Internet. IP Manager translates a dynamic IP address to a fully qualified domain name so you can contact your Raven by name as if it had a static IP.

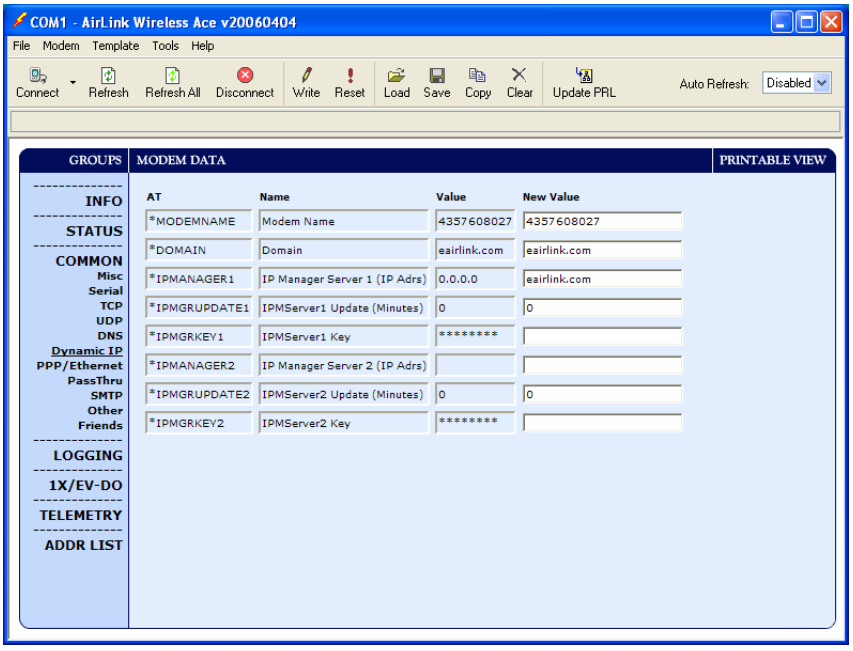
If the Raven is configured for Dynamic IP, when the Raven first connects to the Internet, it sends an IP change notification to IP Manager. IP Manger will acknowledge the change and update the DNS record. The changed IP address will then be the address for the Raven's configured name. Once the Raven's IP has been updated in IP Manager, it can be contacted via name.

Wireless ACE 3G is used to configure the Dynamic IP settings in your Raven so that it will use IP Manager as described below.

Connect with modem using Wireless Ace 3G. Select the Dynamic IP group to configure your modem to use IP Manager.

To configure your AirLink modem to be addressed by name, the modem needs to have four elements configured.

Enter names in the New Value fields for **MODEMNAME**, **DOMAIN**, **IPMANAGER1**, and **IPMGRUPDATE1**.



1. Modem name: A unique name for the modem (the 10-digit MDN number is recommended).

2. Domain: The domain name to be used by the modem (eairlink.com).

3. IP Manager IP Address: The IP or domain name of the dynamic DNS server which is running IP Manager (earlink.com).

4. IP Manager update interval: How often you want the address sent to IP Manager. If this is set to zero, the modem will only send an update if the IP changes (i.e. if the modem is reset or is assigned a different IP).

Restrictions for Modem Name

- Must begin with a letter or number
- Can include a hyphen (-)
- Cannot contain spaces
- Must be no longer than 20 characters total

Click the **Write** icon to save the changes**.**

Click the **Reset** icon to restart the modem.

Click the **Disconnect** icon to terminate communications with the modem.

6. LoggerNet/PC400W Software Setup

The Device Map is configured from the "Setup" button on the LoggerNet/PC400W Toolbar. Configure the Device Map as described below.

1. Selet Add Root | IPPort.

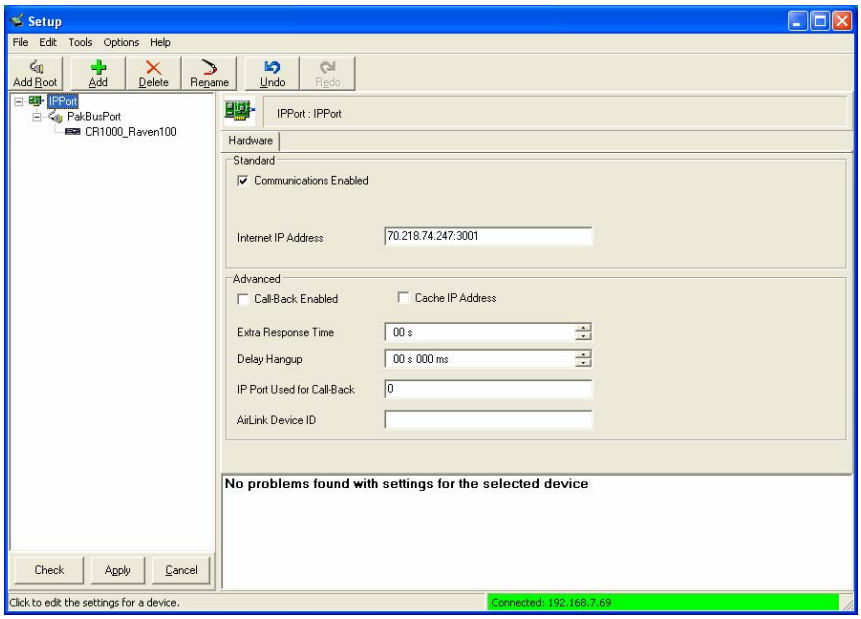
2. Add a datalogger to the IPPort (Pakbus dataloggers, e.g. the CR1000, require a PakBusPort).

3. On the IPPort page, add the IP address/domain name and the Port number (the Raven template file configures the port to be 3001).

4. For PakBus dataloggers, leave the default settings on the PakBusPort page (Extra Response Time may be needed).

5. For PakBus dataloggers, set the PakBus address to match that of the datalogger (default address in the datalogger is 1).

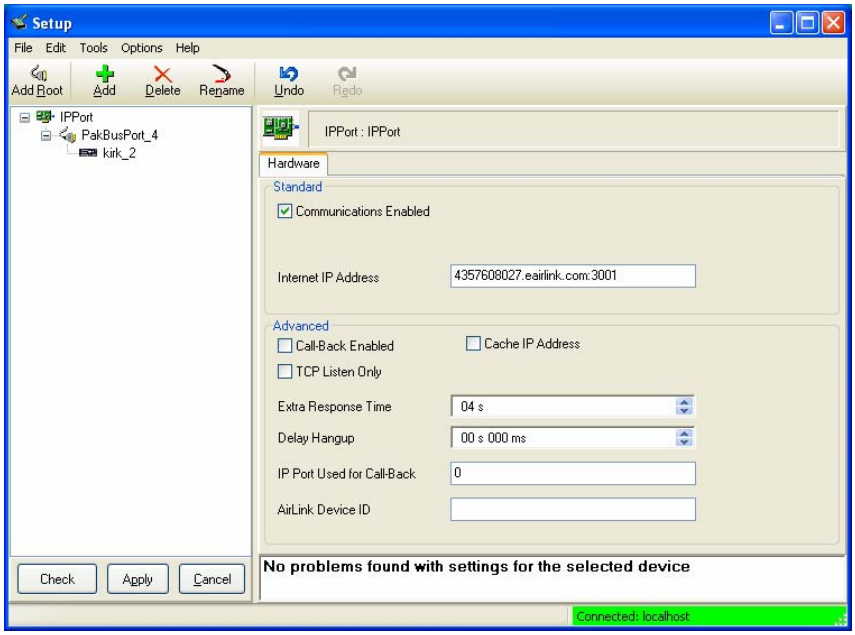
LoggerNet Device Map

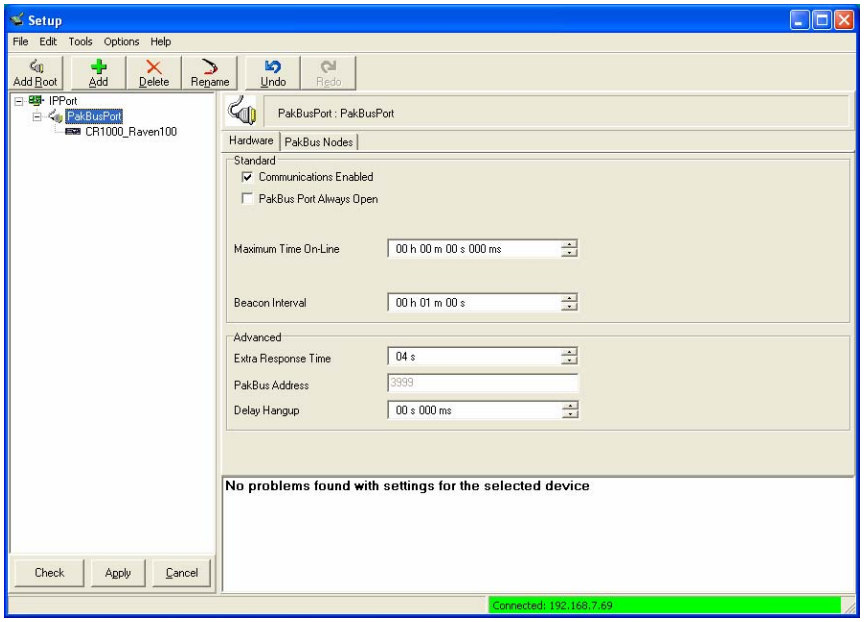


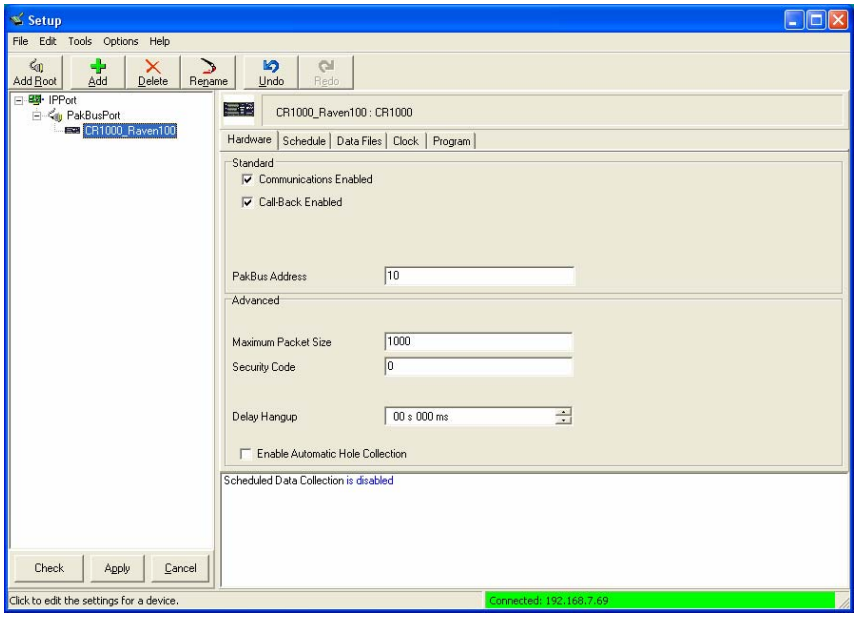
Preceding zeros are not entered in the Internet IP Address (e.g. 070.218.074.247 is entered as 70.218.74.247).

For a Dynamic IP using AirLink's IP Manager, enter the internet IP address as:

xxxx.yyyy:3001, where xxxx is the modem name, yyyy is the Domain name, and 3001 is the port number.




Setup
File Edit Tools Options Help
Add Root
Add
Delete
Rename
Undo
Redo
IPPort
PakBusPort
CR1000_Raven100
PakBusPort : PakBusPort
Hardware
PakBus Nodes
Standard
Communications Enabled
PakBus Port Always Open
Maximum Time On-Line
00 h 00 m 00 s 000 ms
Beacon Interval
00 h 01 m 00 s
Advanced
Extra Response Time
04 s
PakBus Address
3999
Delay Hangup
00 s 000 ms
No problems found with settings for the selected device
Check
Apply
Cancel
Connected: 192.168.7.69


Setup
File Edit Tools Options Help
Add Root
Add
Delete
Rename
Undo
Redo
IPPort
PakBusPort
CR1000_Raven100
CR1000_Raven100 : CR1000
Hardware
Schedule
Data Files
Clock
Program
Standard
Communications Enabled
Call-Back Enabled
PakBus Address
10
Advanced
Maximum Packet Size
1000
Security Code
0
Delay Hangup
00 s 000 ms
Enable Automatic Hole Collection
Scheduled Data Collection is disabled
Check
Apply
Cancel
Click to edit the settings for a device.
Connected: 192.168.7.69

7. Troubleshooting

If LoggerNet/PC400W software is unable to establish a connection with the modem:

1. Check your account information (you may have to call your provider for this or look at your agreement).

    a. Verify there is coverage at your location.

    b. Check the REG light – if it is flickering, it is not registered on the network; if solid green, it is registered on the network.

    c. Make sure the modem has sufficient power.

    d. Check the signal strength (make sure your antenna is properly connected and oriented). Signal strength should be in the -60 to -80 range.

    e. Make sure you have digital (not analog) coverage. For the Raven100 this should be a CDMA/1xRTT account.

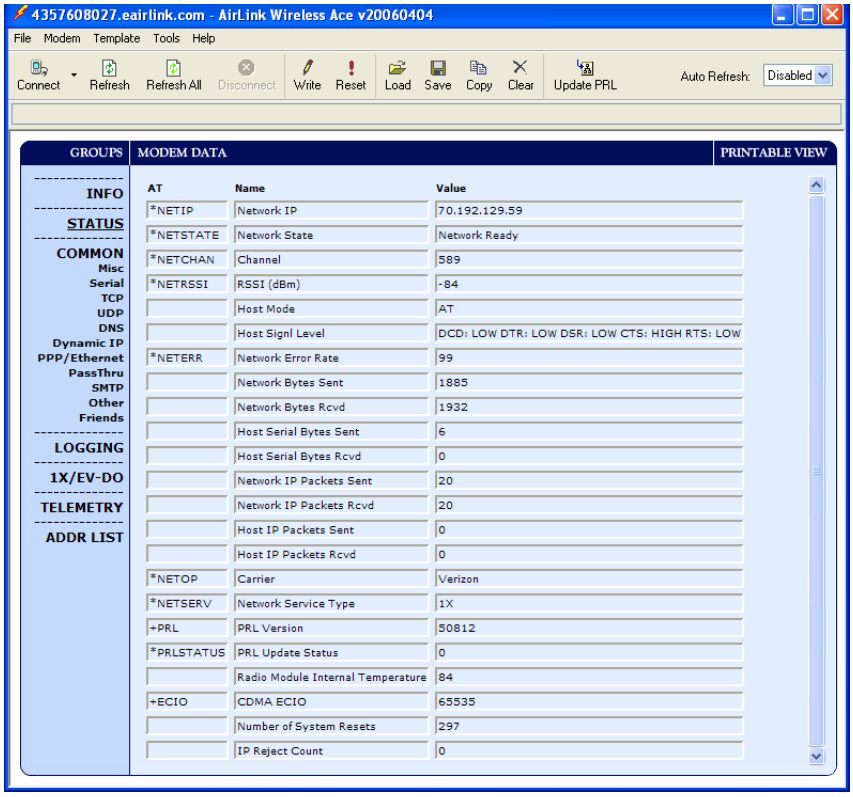
    f. Use Wireless Ace 3G to check the "Network Roaming Preference" setting. This setting is under the "MISC" Group. This setting should be 2 to allow the modem to "Roam", which may be necessary depending on the cellular coverage for the site.

    g. Check the MDN and MSN. If these numbers are not the same, then you will need to enter both of them into the modem (use AirLink's Setup Wizard to do this).

    h. If you have a Static IP account, verify the Static IP Address. Preceding zeros in the IP address are not entered in LoggerNet/PC400W.

    i. If you have a Dynamic IP account, you will need to have a DDNS (dynamic domain name server) name that LoggerNet can reference to make the connection (Section 5.4).

    j. Connect with the modem through the serial port using Wireless Ace 3G. From the "Status" group, make sure the "Network State" is "Network Ready", and note the "Network IP" address. This is the current IP address for the modem (a dynamic IP address will change each time the modem is reset). Try connecting to this IP address using LoggerNet. If LoggerNet connects with the IP address, but not with the modem name.domain name, then there may be a problem with the Dynamic IP setup in the modem (Section 5.4).



If the modem answers but you do not get a connection to the datalogger:

1. Check your connection to the datalogger.

    a. If you are connecting to the CS I/O port on the datalogger, you need to have an SC105 or SC932A

        i. If you have an SC105, the default settings should work for 9600 baud.

        ii. If the SC105 does have the default settings, make sure the datalogger is connected to the datalogger side and the modem is connected to the DCE side.

        iii. If you have tried all of the other troubleshooting ideas and you know the modem is programmed correctly and working and the datalogger is working, try flipping the SC932A around (it may be the label was reversed).

    b. If you are connecting to the RS-232 port of a modem, you will need to have an RS-232 null modem cable. Make sure the cable is properly configured.

2. Check your LoggerNet setup.

    a. Make sure the port number at the end of the IP address matches the port number of the phone (e.g. 3001, see Figure 7-1).

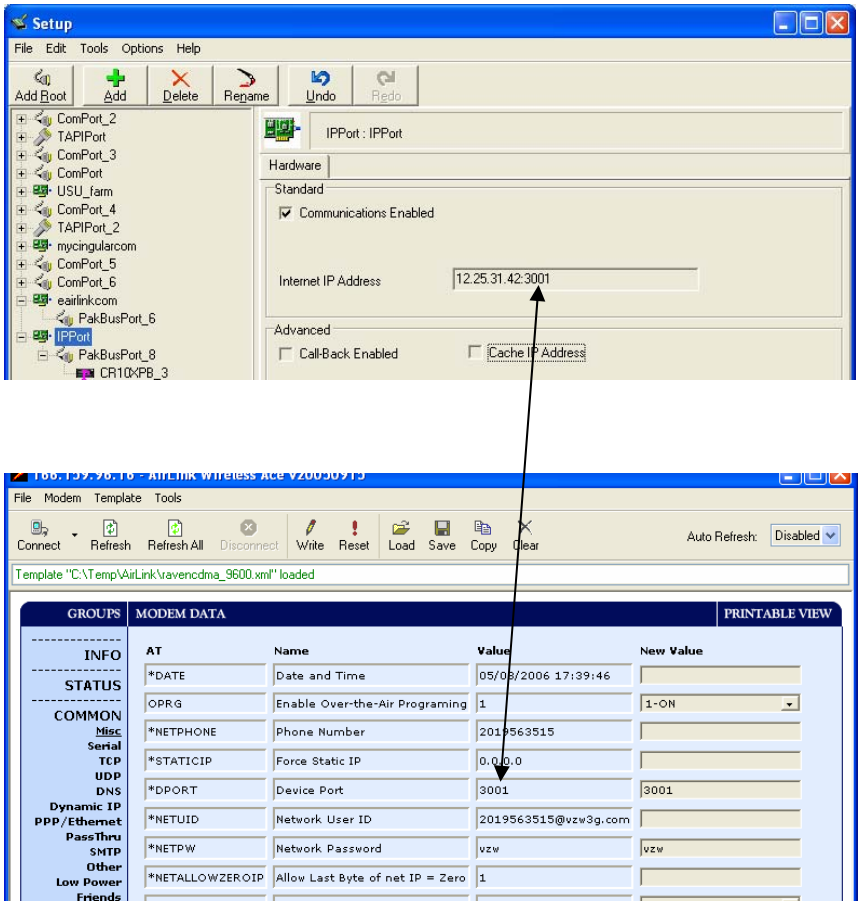


FIGURE 7-1. Device Port Configuration

b. Try adding a few seconds to the extra response time on the IP Port in LoggerNet (you should not need more than 5 seconds).

c. If you are trying to communicate to a PakBus datalogger:

   i. Verify the PakBus address in the setup screen matches that of the datalogger.

   ii. If you have multiple PakBus networks/ports setup in LoggerNet, uncheck the 'PakBus Port Always Open' options on all PakBus ports.

3. See if the modem has incoming and outgoing serial data. You can do this by using AirLink's Wireless Ace. Connect to the modem, and then once you have the settings, go to the 'Status' link and note the serial in and serial out values (see Figure 7-2). Now try to connect to the modem with LoggerNet. If you don't connect in LoggerNet, go back to Wireless Ace and reconnect to the modem to get the settings again. Go to the 'status' link and compare the serial in and serial out values to those you previously obtained.

   a. If they are still the same, the modem is not attempting to make a connection to the datalogger (check the settings in the modem,

compare them to the template from the Campbell Scientific website). See Figure 7-1. The existing value is under the column heading 'Value' and the value we recommend is under the column 'New Value'.

b. If the serial out has increased, the modem attempted to connect to the datalogger, but the response from the datalogger did not make it back to the modem (check your cable connections and interfaces).

c. If both values have incremented, the modem and datalogger are communicating the connection is not being established (try adding extra response time to the LoggerNet Setup). If you have changed the baud rate remotely, the modem will need to be reset for this setting to take affect. This can be done by pressing the 'Reset' button on the Wireless Ace screen. You must have established a connection first before you do this.

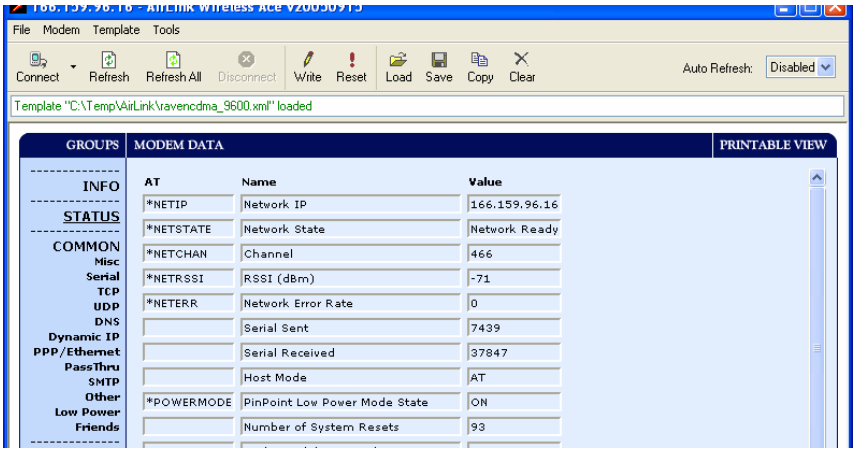


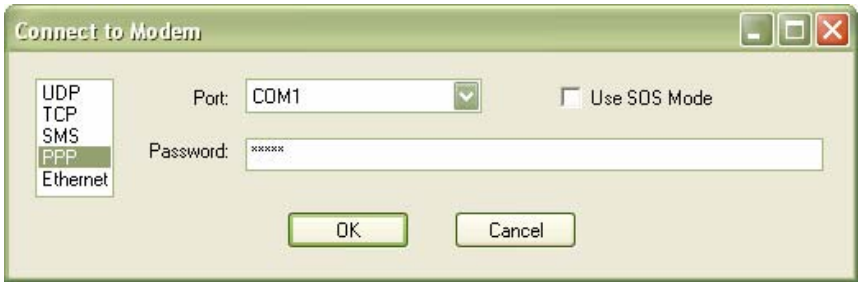
FIGURE 7-2. Wireless Ace status page showing communications with modem.

Appendix A. Wireless Ace Setup without Template File

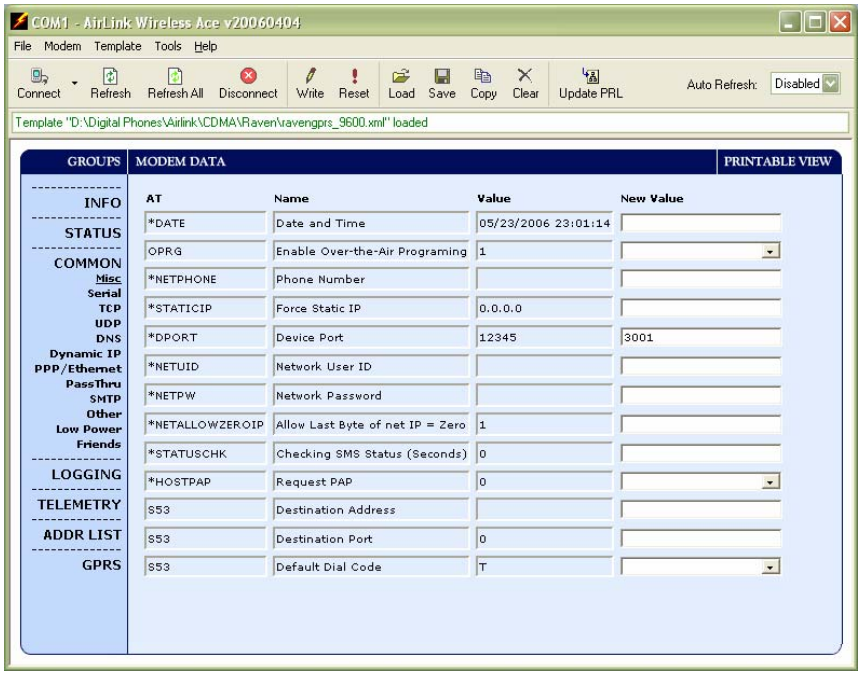
Wireless Ace 3G is used to program settings in the Raven100 and Raven110 modems to make the modems compatible with CSI dataloggers. Airlink CDMA and GPRS template files to send the modems are available on the CSI website (http://www.campbellsci.com/downloads). The procedure for sending the template files is described in Section 5.2.

When the template files are not available, Wireless Ace 3G can be used to change the settings described below.

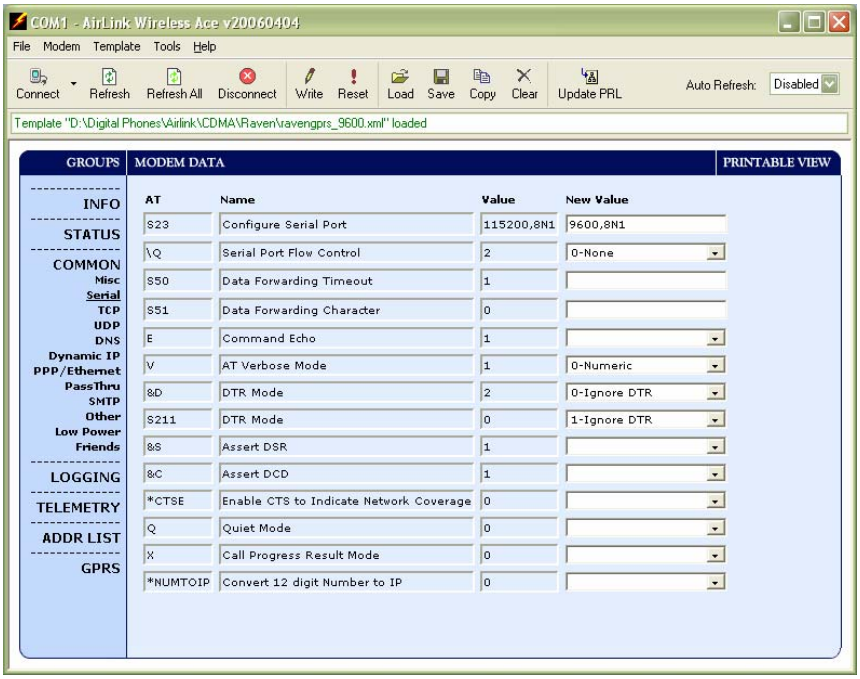
For a direct connection on a COM port use PPP.



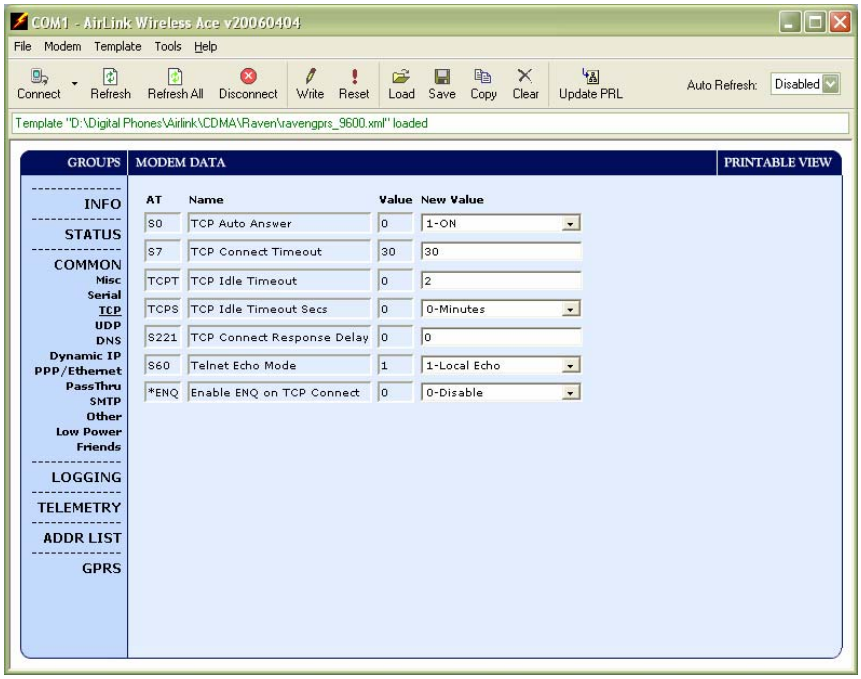
Make a note of the Device port (*DPORT). The default is 12345 and we use 3001 in our template. Any valid port can be used. This is the port number used in LoggerNet to get to the datalogger.



- S23 – Configure Serial Port – The baud rate needs to be configured to match a valid datalogger baud rate. For a CR10X: 9600,8N1 and for a CR1000: 115200,8N1.
- \Q – Serial Port Flow Control – This should be set to None.
- V – AT Verbose Mode – Set this to Numeric.
- &D – DTR Mode – Set to Ignore DTR
- S211 – DTR Mode – Set to Ignore DTR



- S0 – TCP Auto Answer – Set to On
- TCPT – TCP Idle Timeout -- Set to a reasonable value like 2 min.



Appendix B. Configuring the Raven Modem for PPP

The Raven template file configures the Raven to function as a serial server. As a serial server, the modem has an IP address, and port number (3001) for the Raven's RS232 port.

LoggerNet sends data via TCP/IP over the internet to the datalogger. The modem removes the data from the TCP packet and sends the data out the RS232 port to the datalogger. Returning data is put into a TCP packet by the modem and sent back to LoggerNet.

Settings in the Raven and datalogger (CR800, CR1000, and CR3000), can be changed to configure the RS232 serial ports for Point-to-Point (PPP) protocol. When configured as PPP, the Raven functions as a router, routing TCP/IP communications to the IP stack of the datalogger. PPP enables the datalogger to send/receive messages via email, HTTP, FTP to and from the datalogger, and allows concurrent communications between networked dataloggers and LoggerNet.

The default datalogger port number for PakBus/TCP communications is 6785. The datalogger will also respond to port 80 for HTTP, 23 for Telnet, and 21 for FTP. These ports can be disabled in the dataloggers configuration.

NOTE After the RS232 port on the modem has been configured as PPP, use Wireless Ace 3G with a TCP or UDP connection to establish communications with the modem. It may also be possible to connect with the modem through its RS232 port using the "SOS" mode.

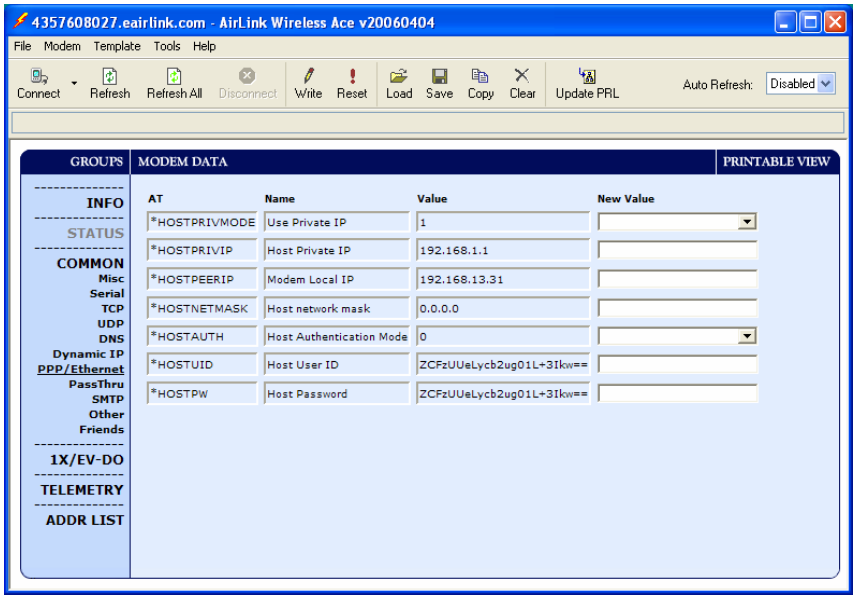
Raven Settings for PPP Mode:

Download the current RavenCDMA Wireless Ace template file from http://www.campbellsci.com/downloads. Load the template into WirelessAce and make the following changes in steps 1 and 2 before writing them to the Raven modem.

Use WirelessAce to configure the following PPP settings:

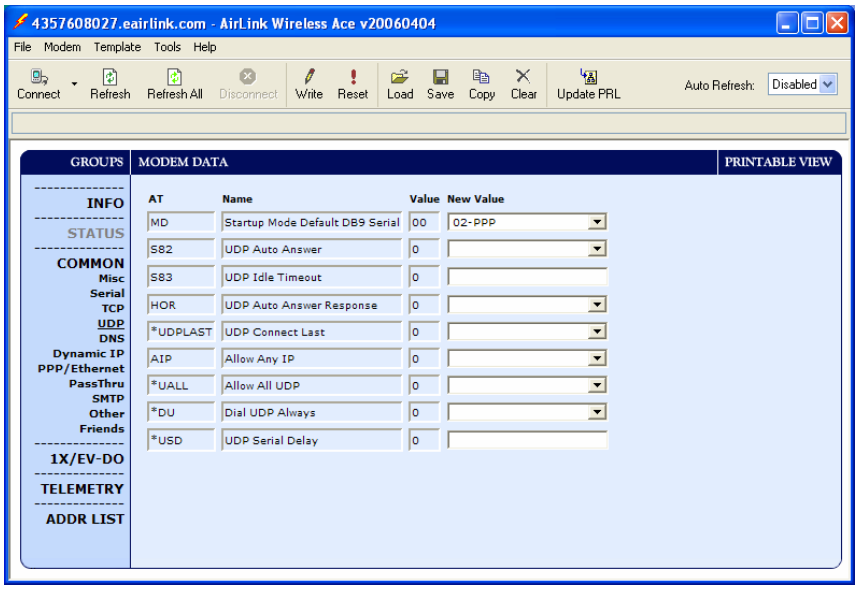
- HOSTPRIVMODE = 1
- HOSTPRIVIP = 192.168.1.1

This will configure the Raven to use NAT (Network Address Translation). These settings should have been configured by the template.



Use WirelessAce to configure the following UDP setting:

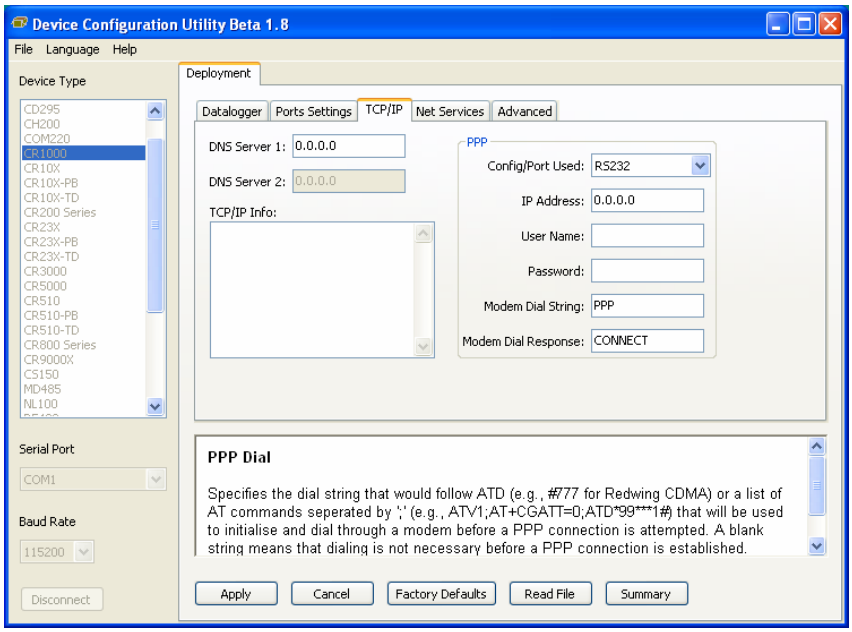
- MD = 02-PPP



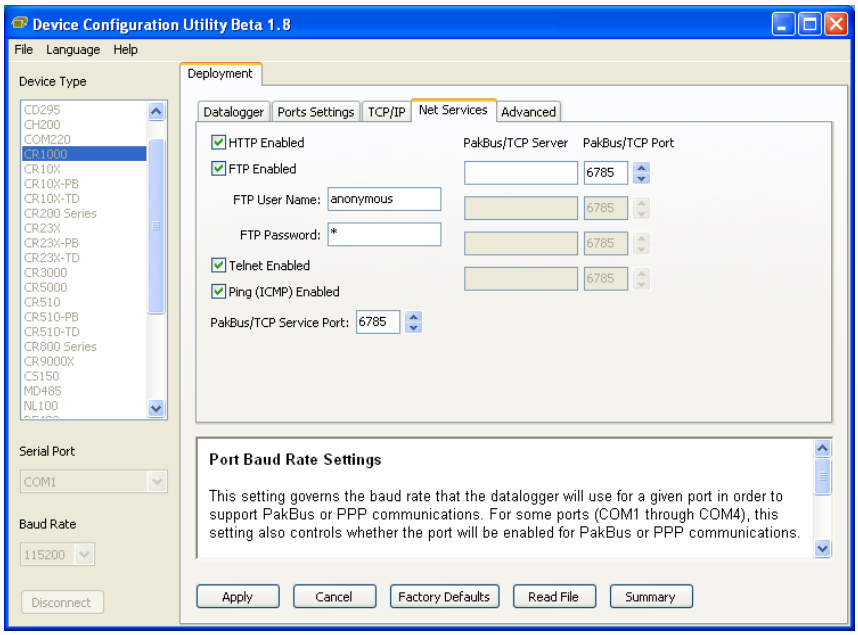
Datalogger Settings:

Using the Device Configuation Utility, configure the following setting on the TCP/IP tab:

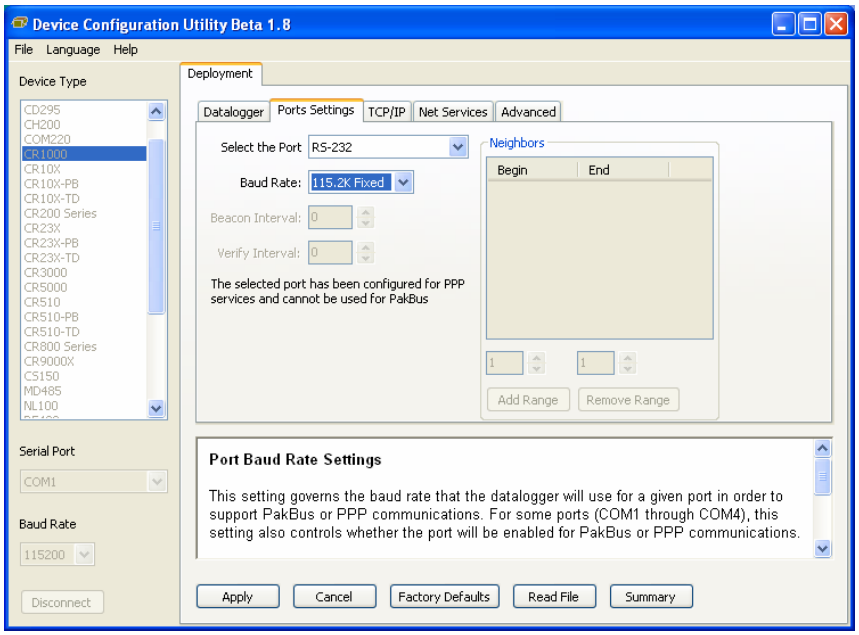
- Config Port Used = RS232
- IP Address = 0.0.0.0
- Modem Dial String = PPP
- Modem Dial Response = CONNECT
- User Name and Password are blank



Using the Device Configuation Utility, select the “Net Services” tab. The “Pakbus/TCP Service Port” default is 6785. This is the “Port” number that will follow the “IP address” for Loggernet to communicate with the datalogger.

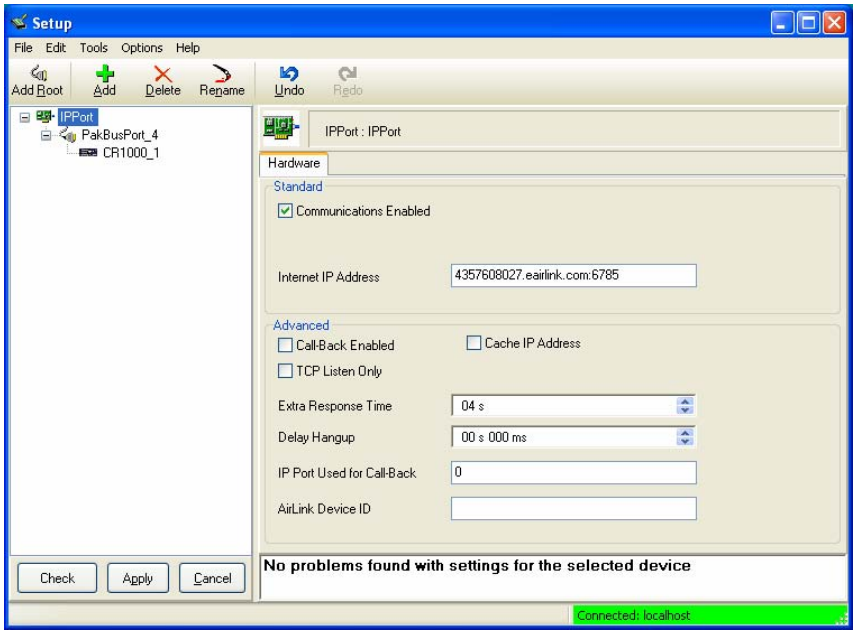


Using the Device Configuration Utility, fix the RS232 Baud Rate to “115200 Fixed” from the “Port Settings” tab.



Loggernet Settings:

Enter the IP address of the Raven, and the PakBus/TCP Service Port number of the datalogger (e.g. 6785 as explained above).



Example CR1000 Program

The following example sends an email message when an alarm condition is True. Both the CR1000 and Raven modem must be configured as PPP as described above.

```
CR1000 Program Example to Send Email Message

'Main program variables
Public Batt, RefTemp, Temp

'declare Email parameter strings (as constants), Message String & Result Variable
Const ServerAddr="smtpauth.earthlink.net""207.69.189.201"
Const ToAddr="datalogger@hotmail.com"
Const FromAddr="datalogger@hotmail.com"
Const Subject="Email Message Test"
Const Attach=""
Const UserName="datalogger@earthlink.net"
Const Password="cr1000"
Const CRLF = CHR(13)+CHR(10)

Public Result as String * 100
Public AlarmTrigger As Boolean
Public Message As String * 250
Public EmailSuccess As Boolean

BeginProg
  Scan (1,Sec,3,0)
    Battery (Batt)
    PanelTemp (RefTemp,250)
    TCDiff (Temp,1,mV2_5C,1,TypeT,RefTemp,True ,0,250,1.0,0)
  NextScan

SlowSequence
  Scan(1,sec,1,0)
    If AlarmTrigger = False Then
      If Temp > 28 THEN AlarmTrigger = True
      If AlarmTrigger Then

        Message = "Warning!" + CRLF + CRLF
        Message = Message + "This is a automatic email message from the datalogger station " + Status.StationName + ". "
        Message = Message + "An alarm condition has been identified. "
        Message = Message + "The temperature is " + Temp + " degrees C." + CRLF + CRLF + CRLF
        Message = Message + "Datalogger time is " + Status.Timestamp

        EmailSuccess=EmailSend (ServerAddr,ToAddr,FromAddr,Subject,Message,Attach,UserName,Password,Result)

      EndIf
    EndIf
    If Temp < 28 then AlarmTrigger=False
  NextScan
EndProg
```

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